**METHODS ML Brazil**

*Study design*

We used the epimed monitor system®, a cloud-based ICU performance management system [x = epimed manuscript - RBTI] to collected retrospective data of patients admitted at the ICU between January 2015 and October 2017 in two distinct hospitals in São Paulo, Brazil: Hospital Israelita Albert Einstein (HIAE), a tertiary care private institution with a total hospital capacity of XXX beds, of these, forty beds are the medical - surgical ICU, that works in an open model and Hospital Municipal Vila Santa Catarina (HMVSC), a tertiary care public institution with a total hospital capacity of XXX beds, of these, twenty beds are the medical – surgical ICU, that works in a close model.

Both hospitals are located and have the same staffing characteristics: physicians available 24 hours a day at a rate of 1 intensivists per each ten ICU beds, daily multidisciplinary rounds and no staff reduction during night shifts or weekends. HIAE and HMVSC have approximately 3,000 and 1,000 ICU admissions annually, respectively.

The core data from this database includes demographic characteristics, patient’s comorbidities, administrative information and also physiological and laboratorial parameters from the first 24h of the ICU admission which allows the calculation of SAPS 3 score.

All data was entered in the database via integration with the hospital medical record, administrative system or manually. Every ICU has a dedicated team that received a specific training with periodic updates to learn how to enter every patient in the database and also to review charts in order to guarantee that all patients that were admitted in the ICU were also entered in the database, avoiding selection bias or missing data [x].

*Ethical approval*

The local ethics committee at Hospital Israelita Albert Einstein approved the study protocol and the need of informed consent was waived (CAAE number XXXXXXX)

*Study population*

All patients in epimed database were eligible for inclusion. The inclusion criteria were the first ICU admission of patients with age ≥ 16 years, however only patients that fulfill SAPS 3 criteria (enabling SAPS 3 score calculation) were included in our final cohort. We excluded patients with more than one ICU admission, patients with missing SAPS 3 score or SAPS 3 mortality prediction and patients with missing hospital outcome information.

*Data extraction*

The following patient baseline characteristics were gathered: age, gender, body mass index, previous health status [ ], length of hospital stay prior to the ICU admission, Charlson comorbidity index [12], smoking status, alcoholism, SAPS 3 score [X] on ICU admission [7], SAPS 3 admission diagnosis, type of ICU admission (emergency, urgent, elective), ICU admission source (emergency department, operating room, floor), procedures (mechanical ventilation, vasoactive medication and hemodialysis) in the first 24 hours of ICU admission ICU and hospital length of stay.

*Data preparation and definitions*

*Outcomes*

The primary outcome was in–hospital mortality. Secondary outcomes included ICU length of stay and hospital length of stay.

*Statistical analysis*

*Development and validation of the new prognostic score.*

1. Missing variables and outliers
   1. Look the specific threshold from GOSSIS and take the median
2. 4 Models
   1. Block 1: Just Vitals (without GCS)
   2. Block 2: Vitals + pre ICU data
   3. Block 3: Vitals + pre ICU + GCS (3/ 4-14/15/NULL)
   4. Block 4: block 3 + lab results
3. Each model
   1. LR with medians\* instead of NULLS
   2. XGBoost\* with medians\* instead of NULLS
   3. XGboost with NULLS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model 01  AUROC (95%CI) | Model 02  AUROC (95%CI) | Model 03  AUROC (95%CI) | Model 04  AUROC (95%CI) |
| LR |  |  |  |  |
| XGBoost\* |  |  |  |  |
| XGBoost |  |  |  |  |

**Discussion**

**SAPS 3 medio das 598 UTI de 318 hospitais- usuários do epimed no Brasil é de 42 +- 16, idade média 62 anos, mortalidade hospitalar 17%**